

SPONGE SHAPE AS A TAXONOMIC CHARACTER: THE CASE OF *SPONGIA OFFICINALIS* AND *SPONGIA AGARICINA*.

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The extreme phenotypical plasticity is one of the main characterizing traits of Porifera at all organizational levels (West Heberard, 1986, 1989; Gaino et al., 1995). Body shape is highly variable both in time and space particularly among demosponges living in shallow waters with high selective pressures exerted by fluctuations of water movement and light, by substrate stability and shape and by spatial competition (Bidder, 1923; Hartman, 1950; Reiswig, 1973; Wilkinson & Vacelet, 1979; Palumbi, 1986; Barthel, 1986, 1991; Pansini & Pronzato, 1990; Gaino et al., 1991; Pronzato & Pansini, 1994). Moreover external morph can be influenced, in some cases, by the age of the sponge and therefore by its life cycle (Barthel, 1986; Manconi & Pronzato, 1991).

Spongia officinalis is reported as being very variable both in colour and body shape not only by spongologists (de Laubenfels, 1948; Storr, 1976; Pronzato et al., in press), but also by fishermen that encounter difficulties distinguishing it from other species as *S. zimocca* or *Ircinia spinosula* and *Cacospongia scalaris*. On the other hand *S. agaricina* displays such a peculiar shape that it is easily identified also by students of zoology. Such a different degree of body shape variation in these two close species is an intriguing case.

The present paper aims to investigate the temporal and spatial evolution of body shape of *Spongia officinalis* and *Spongia agaricina* in order to ascertain if and what external morphological traits can have a diagnostic value to clarify their taxonomic status. The trait of body shape could be considered as the result of several associated sub-traits as growth in height; growth in width; number and shape of oscules; distribution of oscules; presence and distribution of lobes; differentiation of inhalant and exalant area; presence and distribution of conules. A comparative analysis was performed between Eastern and Western Mediterranean populations of *S. officinalis*. The rarity of *S. agaricina* in the Ligurian Sea meant it was not

possible to carry out a comparison with the studied Aegean population.

The following material was considered: *S. officinalis*: 56 specimens collected at 15m depth on hard bottoms by diving at Portofino; 63 specimens at 5-10m depth on hard bottom around the island of Crete; 50 living specimens from Portofino: 25+25 sponges settled, respectively, at 8-10 and 20-25m depth. *S. agaricina*: 37 specimens collected, at 50-100m depth, on sand bottoms by gangava around the island of Kalymnos.

Living sponges were monitored by under-water photography from 1994-1995 in September, July and November to follow the temporal evolution of body shape. To avoid morphological variations linked to pumping activity and to rhythmic contraction/expansion processes, cleaned skeletons were studied at the laboratory. The identification of specimens was performed by SEM at the level of the skeletal net.

Results highlight that *S. agaricina* displays a constant body plan in spite of a wide size variation within the considered population. In the case of *S. officinalis* a constant body plan is displayed by living sponges within the same population at different depth. *Spongia agaricina*: body shape is relatively constant; cup-shaped with distal margin undulati, lateral profile trapezio-like; height and max diameter (at the cup aperture) show an isometric growth; diameter at the base seems to be allometric with respect to the other growth axis and constrained by the substrate morphology; the fan-like shape is absent, with the exception of two specimens, in this population; the distal margin is constantly elliptic with a low difference among the two axis; the irregular growth of the distal margin seems not linked to sponge size. It is possible to hypothesize a shape shifting during ageing from an opened cup toward a tronco-conic shape (*un po' tirata*). □ *Porifera, bath sponges, body shape, variability, Spongia officinalis, Spongia agaricina.*

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